



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
[www.uspto.gov](http://www.uspto.gov)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/698,167	10/30/2003	Mohammad R. Mirabedini	02-6352/LSIIP220	9841
24319	7590	02/16/2005	EXAMINER PRENTY, MARK V	
LSI LOGIC CORPORATION 1621 BARBER LANE MS: D-106 MILPITAS, CA 95035			ART UNIT 2822	PAPER NUMBER

DATE MAILED: 02/16/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

AK

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>
	10/698,167	MIRABEDINI ET AL.
	<b>Examiner</b> MARK V. PRENTY	<b>Art Unit</b> 2822

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on 07 February 2005.
- 2a) This action is **FINAL**.                    2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) Claim(s) 1-6 and 8-26 is/are allowed.
- 6) Claim(s) 7 and 27 is/are rejected.
- 7) Claim(s) \_\_\_\_\_ is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All    b) Some \* c) None of:
1. Certified copies of the priority documents have been received.
  2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                    | Paper No(s)/Mail Date. _____.   |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____. | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
|   | 6) <input type="checkbox"/> Other: _____.                                   |

This Office Action is in response to the amendment filed on February 7, 2005.

Claim 7 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Specifically, independent claim 1 recites, "a calcium and boron doped polysilicon gate electrode on the gate dielectric," but claim 7, which depends on claim 1, inconsistently recites "wherein the calcium is doped into the polysilicon gate electrode such that it forms a thin atomic layer at the gate electrode/gate dielectric interface" (i.e., independent claim 1 recites (and amended dependent claim 7 now reiterates) that the polysilicon gate is doped with calcium, but dependent claim 7 then inconsistently recites that the calcium is a thin atomic layer separate from the polysilicon gate – note the specification at paragraph [0033]).

Independent claim 27 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Specifically, independent claim 27 first recites, "a calcium doped gate electrode on the gate dielectric,"<sup>1</sup> but then inconsistently recites, "a thin atomic layer of calcium at an interface between the gate electrode and gate dielectric" (i.e., the device comprises either a calcium (and boron) doped gate electrode OR a thin atomic layer of calcium at an interface between a (boron doped) gate electrode and a gate dielectric – see the entire specification, including paragraph [0033]).

---

<sup>1</sup> It's possible, however, that independent claim 27's, "a calcium doped gate electrode," is a typographical error that should read, "a boron doped gate electrode" (see the applicant's remarks at page 7, third paragraph). In that case, (corrected) claim 27 would not be indefinite.

Claim 27, at least insofar as understood,<sup>2</sup> is rejected under 35 U.S.C. 102(e) as being anticipated by Aronowitz et al. (United States Patent Application Publication 2004/0110328 – hereafter Aronowitz – already of record). Specifically, Aronowitz discloses a semiconductor device (see the entire reference, including the Fig. 1 disclosure), comprising: a P-channel MOS field-effect transistor (see paragraph [0018]) comprising, a semiconductor substrate 60; a gate dielectric 20 on the substrate; a boron doped gate electrode (see paragraph [0018]) on the gate dielectric; and a thin atomic layer of calcium 10/50 at an interface between the gate electrode and gate dielectric. Claim 27, at least insofar as understood, is thus rejected under 35 U.S.C. 102(e) as being anticipated by Aronowitz.

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double

---

<sup>2</sup> To advance prosecution, indefinite independent claim 27's, "a calcium doped gate electrode on the gate dielectric," is taken to mean, "a boron doped gate electrode on the gate dielectric," as per the applicant's remarks about independent claim 27 (see the applicant's response at page 7, third paragraph). See also footnote 1, above.

patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Claim 27, at least insofar as understood,<sup>3</sup> is provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 11 of copending Application No. 10/313,333 in view of Tanida et al. (United States Patent Application Publication 2003/0168705 – hereafter Tanida – already of record. Specifically, the difference between claim 27 and application 10/313,333's claim 11 is the former uses the latter's boron-doped gate in a semiconductor device comprising a PMOS field-effect transistor formed on a semiconductor substrate. Tanida teaches that boron-doped gates are conventionally used in PMOS field-effect transistors formed on semiconductor substrates (see the entire reference, including paragraphs [0011-0012], for example). It would have been obvious to one skilled in this art to use application 10/313,333's claim 11's boron-doped gate in a PMOS field-effect transistor formed on a semiconductor substrate, because Tanida teaches that boron-doped gates are conventionally used in PMOS field-effect transistors formed on semiconductor substrates. Claim 27, at least insofar as understood, is thus provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 11 of copending Application No. 10/313,333 in view of Tanida.

This is a provisional obviousness-type double patenting rejection.

Claims 1-6 and 8-26 are allowable over the prior art of record.

---

<sup>3</sup> To advance prosecution, indefinite independent claim 27's, "a calcium doped gate electrode on the gate dielectric," is taken to mean, "a boron doped gate electrode on the gate dielectric," as per the applicant's remarks about independent claim 27 (see the applicant's response at page 7, third paragraph). See also footnote 1, above.

The applicant's argument with respect to the rejection of claim 7 is not understood. Specifically, although the applicant alleges: "Claim 7 has been amended to more clearly claim that 'the calcium is doped into the polysilicon gate electrode such that it forms a thin atomic layer at the gate electrode/gate dielectric interface,'" (emphasis in original), such actually compounds, rather than resolves, dependent claim 7's inconsistency in first reciting a gate electrode doped with calcium and then reciting a thin atomic layer of calcium at the gate electrode/gate dielectric interface. Again, see the specification at paragraph [0033]. See also the above rejection of newly added independent claim 27 under 35 USC 112, second paragraph.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Registered practitioners can telephone the examiner at (571) 272-1843. Any voicemail message left for the examiner must include the name and registration number of the registered practitioner calling, and the Application/Control (Serial) Number. Technology Center 2800's general telephone number is (571) 272-2800.

*Mark Prenty*  
Mark V. Prenty  
Primary Examiner